Amendments to the Specification:

Please replace paragraph [0002] starting on page 1 with the following rewritten paragraph:

[0002] Magnetic recording disks such as hard disks and flexible disks are widely used as storage media in computers. A ~~Magnetic~~ magnetic recording disk~~s~~ have a basic structure where a magnetic recording layer is provided on a disk-shaped substrate.

Please replace paragraph [0003] starting on page 1 with the following rewritten paragraph:

[0003] Manufacture of a magnetic recording disk is described as follows, taking a hard disk as an example. Conventionally, a substrate made of aluminum is employed in manufacturing a hard disk. A NiP (nickel phosphide) film is deposited on the aluminum-made substrate. On the NiP film, such a film as CoCr film is deposited as an ~~underling~~ underlying layer. On the underlying layer, such a film as CoCrTa film is deposited as a magnetic film for the magnetic recording layer. On the magnetic recording layer, a carbon film having a structure similar to diamond, which is called "diamond-like-carbon (DLC) film", is deposited as a protection layer called "overcoat".

Please replace paragraph [0005] starting on page 3 with the following rewritten paragraph:

[0005] Factor of magnetization-transition region is also important in

increasing recording density. In the longitudinal recording, magnetic domains are magnetized alternatively to opposite directions along a track. Each boundary of the magnetic domains does not demonstrate clear linearity in width of the track. This is because the magnetic film is collectively made of fine crystal grains. Each boundary is formed of outlines of crystal grains. Therefore, each boundary is zigzag-shaped. Boundary of magnetic domains is called "magnetization-transition region" because it is the place where magnetization is inverted. Because each boundary is zigzag-shaped, magnetization transition averaged in track width is not sharp but ~~gently~~ gentle. This means magnetization-transition region is wider. When magnetization-transition region is wider, the number of magnetic domains capable of being provided in limited length of a track is smaller. Therefore, factor of magnetization-transition region lies as a bottleneck in enhancing recording density.

Please replace paragraph [0007] starting on page 4 with the following rewritten paragraph:

[0007] When a magnetic domain is magnetized, theoretically the magnetization is sustained unless the inverse magnetic field is applied to it. Practically, however, the magnetization is dissolved slightly and slightly from the thermal decay as time passes. Therefore, permanent sustenance of the magnetization is impossible unless the magnetic domain is cooled at the absolute zero temperature. If the problem of the thermal decay appears extreme~~ly~~, recorded information may vanish partially after several years pass. Such ~~the~~ a result is greatly serious in case that the magnetic recording disk is used for semipermanent information storage.

Please replace paragraph [0017] starting on page 10 with the following rewritten paragraph:

[0017] The anisotropy-allowing layer 92 allows the anisotropy by coordinating crystal orientation of each grain in the magnetic recording layer 91. In manufacturing conventional magnetic recording disks, a nickel-phosphide film or nickel-aluminum film is initially prepared on a substrate. The anisotropy-allowing layer 92 may be a substitute for such ~~the~~ a nickel-phosphide film or nickel-aluminum film.

Please replace paragraph [0018] starting on page 10 with the following rewritten paragraph:

[0018] The nickel-phosphide film ~~and~~ or nickel-aluminum film in ~~the~~ a conventional magnetic recording disk~~s~~ ~~are~~ is to reinforce physical strength of the disk~~s~~ by increasing the hardness of the disk~~s~~. In the study by the inventors, it has turned out that such a film initially deposited on the substrate 9 sometimes affects the magnetic anisotropy of the magnetic recording layer 91. Specifically, it has turned out that: when a film of nitride of niobium, tantalum, niobium alloy or tantalum alloy, or nitrogen-including niobium, tantalum, niobium alloy or tantalum alloy, is initially deposited on the substrate 9; the magnetic anisotropy can be effectively allowed to the magnetic recording layer 91. Therefore, the anisotropy-allowing layer 92 in the embodiment is the film of material selected from such ~~the~~ species. For example, a chromium-niobium (CrNb) alloy film is deposited as the anisotropy-allowing layer 92. Thickness of the film may be 1 to 200nm.

Please replace paragraph [0024] starting on page 14 with the following rewritten paragraph:

[0024] The carrier 2 holds the substrates 9 at several points on the edges. In this embodiment, a couple of substrates 9 are held together on one carrier 2. The transfer mechanism moves the carrier 2 by driving force introduced from the outside atmosphere to the inside through a magnetic-coupling mechanism. Many driven rollers to support the carrier 2 are aligned on the transfer path. When the driven rollers are operated, the carrier 2 is moved ~~transferring~~ from one driven roller to another. As ~~such~~ the carrier 2 and the transfer mechanism, the disclosure in USP No. 6,027,618 can be employed.

Please replace paragraph [0025] starting on page 14 with the following rewritten paragraph:

[0025] For manufacturing the described magnetic recording disk, between the pre-heat chamber 83 and the underlying layer preparation chamber 84, the system of this embodiment comprises an anisotropy-allowing-layer preparation chamber 1 in which the anisotropy-allowing layer is prepared on the pre-heated substrate 9, and a gas-exposure chamber 89 in which the ~~substrate 9~~ <u>anisotropy-allowing layer</u> is exposed to a required gas. These chambers 1 and 89 are described in detail as follows.

Please replace paragraph [0030] starting on page 17 with the following rewritten paragraph:

[0030] Referring to Fig. 4, oblique incidence of sputtered particles for the anisotropy allowance is described as follows. As understood from Fig. 3 and Fig. 4, three targets 30 are provided in this embodiment. Each target 30 is equally distant from each other on a circle in coaxial to the substrates 9, i.e. at every 120 degree. The ~~tree~~ three targets 30 are rotated by a main rotation mechanism coaxially with the substrate 9. A direction-control board 39 is provided between the targets 30 and the substrate 9. The direction-control board 39 is fixed to the targets 30 by a member so that it can be rotated together with the targets 30.

Please replace paragraph [0031] starting on page 18 with the following rewritten paragraph:

[0031] In the structure where the target 30 is placed eccentrically ~~to~~ from the substrate 9, major sputtered particles from the target 30 are incident obliquely to the substrate 9. As shown in Fig.4, though some sputtered particles S1 travel to the direction interconnecting the center of the target 30 and the center of the substrate 9 (hereinafter called "center-center direction"), many other sputtered particles S2 travel deviating from the center-center direction. These sputtered particles S2 that travel deviating from the center-center direction are hereinafter called "deviant oblique sputtered-particles". The deviant oblique sputtered-particles contribute to the anisotropy allowance to the magnetic recording layer.

Please replace paragraph [0032] starting on page 19 with the following rewritten paragraph:

[0032] The anisotropy-allowing-layer preparation chamber 1 in this embodiment comprises a main rotation mechanism. The main rotation mechanism is to rotate the targets 30 around axes eccentric ~~to~~ from the targets 30 and corresponding to the substrate 9, so that a homogeneous and uniform film can be deposited. This mechanism is described in detail as follows.

Please replace paragraph [0042] starting on page 24 with the following rewritten paragraph:

[0042] The rotary actuator 351 of the main rotation mechanism is mounted on a base board 300. The base board 300 is provided uprightly. An opening ~~though~~ through which a spindle 37 is inserted is provided with the base board 300. A gear holder 360 is provided at the edge of the opening, being lengthened horizontally. The gear holder 360 is roughly ~~cylindrical~~ a cylinder of which the center axis corresponds to the basis axis A.

Please replace paragraph [0044] starting on page 25 with the following rewritten paragraph:

[0044] As understood from Fig. 5, because each magnet assembly 5 is connected with the cathode mount 32 by the shaft 363, when each target 30 is rotated around the basis axis A as the main holder 31 is rotated by the rotary actuator 351, each magnet assembly 5 and each driven gear 361 are rotated around

the basis axis A as well. This rotation around the basis axis A is hereinafter called "revolution". Because each driven gear 361 engages each standing gear 362 at the side closer to the basis axis A, each driven gear 361 is rotated around the center axis corresponding to each center axis of target 30 during the revolution. This rotation around the center axis of the target 30 is hereinafter called "spin". As each driven gear 361 is spun, each magnet assembly 5 is spun together. After all, the magnet assembly 5 performs the revolution around the basis axis A and the spin around its center axis simultaneously. A bearing 7 is provided between the gear holder 360 and the unit mount 6.

Please replace paragraph [0046] starting on page 26 with the following rewritten paragraph:

[0046] In the left cylindrical half of the spindle 37 (hereinafter "cylindrical portion"), a coolant introduction pipe 373 and coolant drainage pipes 374 are provided. The coolant introduction pipe 373 is connected with the coolant introduction channel 371. The coolant drainage pipes 374 are connected with the coolant drainage holes 372 respectively, though only one appears in Fig. 5. Power-supply rods 381 are provided penetrating the column portion and the cylindrical portion of the spindle 37. The power-supply rods 381 are to supply power for the sputtering discharge to each target 30. Three power-supply rods 381 are provided, though only one appears in Fig. 5. As shown in Fig. 5, the top of the power-supply rod 381 is in contact with the cavity board 33. The cavity board 33 and the backing plate 34 are made of metal such as stainless-steel or ~~cupper~~ copper so that the power can be supplied through them to the target 30. ~~An insulator~~ Insulators (not shown) ~~is~~ are provided between the power-supply rods 381 and the

spindle 37, between the cavity board 33 and the targets 30, between the cavity board 33 and the spindle 37, and between the backing plate 34 and the spindle 37. Therefore, the power supplied through the power-supply rods 381 does not leak to the spindle 37.

Please replace paragraph [0047] starting on page 27 with the following rewritten paragraph:

[0047] In the described revolution, the spindle 37 is also revolved around the basis axis A. A slip ring 382 and a rotary joint 375 are provided so that the power supply and the coolant circulation are enabled in spite that the spindle 37 is revolved. As shown in Fig. 5, the slip ring 382 is provided surrounding the left end of the spindle 37. Power supply rods 381 are connected with the slip ring 382 by cables. The slip ring 382 is connected with three sputter power sources 4, which are provided corresponding to three targets 30 respectively.

Please replace paragraph [0055] starting on page 32 with the following rewritten paragraph:

[0055] The intermediate-layer preparation chamber 88 and the magnetic-recording-layer preparation chamber 80 are also the chambers in which ~~a~~ required thin films ~~is~~ are deposited by sputtering. A CoCr alloy film is deposited as the intermediate layer, and a CoCrPtB alloy film or CoCrPtTa alloy film is deposited as the magnetic recording layer. Therefore, the target in the intermediate-layer preparation chamber 88 is made of CoCr alloy, and the target in the magnetic-recording-layer preparation chamber 80 is made of CoCrPtB alloy or CoCrPtTa

alloy. Gas to be introduced may be argon for the both chambers 88, 80. When the sputtered-particles oblique-incidence configuration is employed in the intermediate-layer preparation chamber 88 or the magnetic-recording-layer preparation chamber 80 as well, the anisotropy allowance is enhanced further.

Please replace paragraph [0060] starting on page 36 with the following rewritten paragraph:

[0060] Repeating such ~~the~~ steps, every carrier 2 is moved to a next chamber at every tact-time. The pre-heat, the anisotropy-allowing-layer preparation, the oxygen gas exposure, the underlying-layer preparation, the intermediate-layer preparation, the magnetic-recording-layer preparation and the overcoat preparation are carried out on each substrate 9 in this order. After the overcoat preparation, the carrier 2 is moved to the unload-lock chamber 82, in which the processed substrates 9 are unloaded from the carrier 2. In these steps, if any layer is composed of a plurality of films, i.e. laminated layer, the preparation step may be carried out subsequently in a series of chambers.

Please replace paragraph [0061] starting on page 37 with the following rewritten paragraph:

[0061] The method and the system of this embodiment as described can perform the anisotropy allowance effectively. This point is described as follows using Fig. 6. Why the deviant oblique sputtered-particles contribute to the anisotropy allowance is not completely clear. Following is one presumption for this. As shown in Fig. 6, the deviant oblique sputtered-particles incident on the substrate

9 have a direction component along a tangent of a circle coaxial to the substrate 9. When many sputtered particles having a direction component not perpendicular to the substrate 9 are incident on the substrate 9, it is presumed that axes of crystals in the thin film being deposited tend to be oblique to this direction, or crystals tend to grow to this direction. For example, many fine bumps 92 leaning to a tangent direction are possibly formed, as schematically drawn are Fig. 6. If such many sputtered particles having a fixed direction component are incident on the substrate 9, structure or property of the deposited thin film becomes anisotropic along this direction. Overlaying the underlying layer, the intermediate layer and the magnetic recording layer in order on such ~~the~~ an anisotropic thin film, the magnetic recording layer would capture the anisotropy as well.

Please replace paragraph [0063] starting on page 39 with the following rewritten paragraph:

[0063] As understood from the configuration where the target is rotated in coaxial with the substrate 9, this embodiment allows the circumferential anisotropy. Concretely, as shown in Fig. 6, sputtered particles S2 incident obliquely on the substrate 9 have the direction components along ~~a~~ tangents. Because the target is rotated against the standing substrate 9, the inclinations of the crystals shown in Fig. 6 associate circumferentially. Therefore, coercive force in magnetizing circumferentially is higher than coercive force in magnetizing along a radius direction.

Please replace paragraph [0066] starting on page 41 with the following rewritten paragraph:

[0066]

Table 1

Anisotropy-allowing film	Perpendicular incidence (Cr film)	Oblique incidence (Cr film)
Not exist	OR-1.0	OR-1.0
Exists (CrNb nitride film)	OR-1.1	OR-1.2

Please replace paragraph [0068] starting on page 42 with the following rewritten paragraph:

[0068] Next, on another substrate, after depositing a CrNb nitride film as the anisotropy-allowing layer, a Cr film as the underlying layer and a CoCrPtB film as the magnetic recording layer were deposited in the same way. Then, the magnetic anisotropy was measured. In this experiment, the Cr film depositions were carried out on the two different sputtering configurations; i.e. the sputtered-particles perpendicular-incidence configuration where the substrate and the target face to each other coaxially, and the described sputtered-particles oblique-incidence configuration. Therefore, there were four samples in this experiment. In each deposition, each substrate was maintained at 200°C, and the sputter-discharge power was 500W. In depositing the CrNb nitride film, gas mixture of argon and nitrogen where nitrogen ~~is~~ was added at 5 to 30% against argon ~~is~~ was used. Pressure in the chamber during depositing the CrNb nitride film was 3Pa. After

the CrNb nitride film deposition, the substrate was exposed to atmospheric gas of 10^{-3}Pa in another chamber. Composition of the CrNb alloy target used in this experiment was 70Cr-30Nb (at%). The gas exposure may be carried out subsequently in the chamber where the CrNb nitride film is deposited. In this case, after depositing the CrNb film, the chamber ~~is~~ was pumped down to a required pressure lower than 10^{-3}Pa. Then, atmospheric gas ~~is~~ was introduced to the chamber so that as the pressure can be 10^{-3}Pa, exposing the substrate to the atmospheric gas of 10^{-3}Pa.

Please replace paragraph [0075] starting on page 48 with the following rewritten paragraph:

[0075] In the described conventional hard-disk manufacturing process, for example, fine grooves as texture are provided with a NiP film. Because a hard-disk drive[s] rotates a magnetic recording disk around its center axis against a standing magnetic head during write-and-readout of information, directions of magnetization are usually circumferential, more precisely tangent directions of circles coaxial with the disk. Therefore, the magnetic anisotropy is required to be allowed to circumferential directions. For such ~~the~~ anisotropy, fine grooves as texture are usually provided circumferentially in coaxial to a substrate. In a cross section, this type of texture is saw-tooth-shaped.

Please replace paragraph [0076] starting on page 49 with the following rewritten paragraph:

[0076] Crystal orientation of an underlying film deposited on ~~such~~ the NiP film having the grooves tends to be circumferential, resulting in that crystal orientation of a magnetic recording film deposited on it tends to be circumferential as well. Therefore, the magnetic anisotropy where coercive force is higher in the circumferential magnetization is allowed to the magnetic film.

Please replace paragraph [0077] starting on page 49 with the following rewritten paragraph:

[0077] However, the described anisotropy allowance by ~~the~~ texture bears some disadvantages with respect to demand for narrowing *spacing*. This point is described as follows using Fig. 9. As described, narrowing *spacing* is required for enhancing recording density. However, texture could be an obstructive factor for narrowing *spacing*. As shown in Fig. 9, if a texture exists, the surface 901 of a magnetic recording layer is uneven, i.e. concave-convex, corresponding to the shape of the texture. The distance to a magnetic head 902, i.e. *spacing* S, can be narrower to some extent at the convexes. However, *spacing* S is inevitably wider at the concaves. Therefore, write-and-readout of information might be unstable at the concaves. If the magnetic head 902 is located closer to the surface 901 of the magnetic recording layer, it would contact such an overlying layer as overcoat (not shown in Fig. 9). As a result, there might arise ~~a~~ <u>the</u> problem that the magnetic head 902 is stuck on the magnetic recording disk, or the magnetic recording disk is damaged by the magnetic head 902.

Please replace paragraph [0078] starting on page 50 with the following rewritten paragraph:

[0078] Such ~~the~~ problems can be solved by providing a lubricant layer on the top of the magnetic recording disk. However, as far as a texture exists, it is impossible to make *spacing* narrower than height (or depth) of the texture. Therefore, there has been great demand for a technique to allow the magnetic anisotropy without providing <u>any</u> texture.

Please replace paragraph [0079] starting on page 50 with the following rewritten paragraph:

[0079] The described system and method of this embodiment can present such ~~the~~ <u>a</u> technique. In this embodiment, no texture-providing step is required. Without texture, the described effect of the anisotropy allowance can be obtained as well. Therefore, this embodiment brings no obstructive factor for narrowing *spacing*, contributing to the recording density enhancement. Still, the present invention does not exclude to provide a texture. When a texture is provided in this invention, the allowed magnetic anisotropy can be enhanced further~~more~~.

Please replace paragraph [0080] starting on page 51 with the following rewritten paragraph:

[0080] Direction control of sputtered particles in depositing films by sputtering is not indispensable in this invention. For example, in case a texture is

provided on a substrate in this invention, it is possible to allow the magnetic anisotropy by a normal sputtering configuration. Otherwise, the anisotropy allowance is enabled only by locating a target eccentrically ~~to~~ <u>from</u> a substrate for the sputtered-particles oblique-incidence configuration, without using a direction control board.